

## REMARKS

Applicant requests favorable reconsideration and allowance of the subject application in view of the following remarks.

Claims 44-63 remain pending in this application, with Claims 44, 46, 48, 50, and 61 being independent.

Claims 45, 47, 49, and 51 stand objected to under 35 U.S.C. § 1.75(c), as being of improper dependent form. Applicant traverses this objection and submits that Claims 45, 47, 49, and 51 are not broader than their respective independent claims.

Specifically, the objected to dependent claims recite the Abbe number of the optical material formed by combining the first and second materials defined in their respective independent claims. The independent claims recite the Abbe number of the second material used to form that combination. Consequently, the Abbe numbers recited in the independent and objected to dependent claims refer to different materials (the Abbe number of the mixture versus the Abbe number of one material used in the mixture).

Claims 45, 47, 49, and 51 stand rejected under 35 U.S.C. § 102 as being anticipated by International Publication No. WO 98/45108 (Cabeza, et al.). Applicant traverses this rejection.

As generally recited in each of the independent claims, Applicant's invention is directed to an optical material formed by mixing materials comprising a first material having a refractive index of not more than a specified amount for the d-line and a second material having an Abbe number of not more than a specified amount. With a predetermined ratio of mixture of the first material and the second material, a relationship between the refractive index for the d-line ( $n_d$ ) and an Abbe number ( $v_d$ ) is defined as  $n_d \leq -6.667 \times 10^{-3} v_d + 1.70$ .

Cabeza, et al. includes comparative example J-L. In that example, four materials are combined to provide a resin composition used in an optical element. The materials

include Trifluro ethymethacrylate ( $n_d = 1.43$ ,  $v_d = 65$ ) (which has a low refractive index), Polystyrene ( $n_d = 1.592$ ,  $v_d = 30$ ), Polybenzylmethacralate ( $n_d = 1.565$ ,  $v_d = 36.5$ ), and polydidithiomethacrylate ( $n_d = 1.62$ ,  $v_d = 36$ ). The lens formed with these elements has a vGRIN = 12.6, 37, 37.

Generally, the refractive index  $v_d$  for d-line is calculated as follows:

$$v_d = \frac{n_d - 1}{n_F - n_c}$$

wherein  $n_f$  is a refractive index of light having wavelength of 435.835 nm,  $n_d$  is a refractive index of light having wavelength of 587.56 nm, and  $n_c$  is a refractive index of light having a wavelength of 656.27 nm.

In Cabeza, et al., however, vGRIN refers to an Abbe number upon distribution of the refractive index of a vGRIN lens having a radial refractive index. The value for vGRIN is calculated as follows:

$$v\text{ GRIN} = \frac{(n_{2D} - n_{1D}) \ v_1 v_2}{(n_{2D} - 1) \ v_1 - (n_{1D} - 1) \ v_2}$$

According to this equation, the value of vGRIN will be greater as the difference between the refractive indices and the difference between the Abbe numbers increase, when the material having a high refractive index and a high Abbe number is mixed with a material having a low refractive index and low Abbe number. Thus, vGRIN differs from  $v_d$  of the present invention.

In this regard, Applicant notes that if Trifluoro ethymethacrylate having an Abbe number of 65 is mixed with Polystyrene having an Abbe number of 30, the Abbe number of the combined material will be a value between 30 and 65 with the invention recited in the present independent claims. In the material described in Cabeza, et al., however, such a

combination has a vGRIN value of 12.6.

Accordingly, Applicant submits that Cabeza, et al. fails to disclose or suggest, at least, the features of an optical material formed by mixing materials comprising a first material having refractive index of a specified amount for the d-line and a second material having an Abbe number of not more than a specified amount, wherein with a predetermined ratio of mixture of the first material and the second material, a relation between a refractive index for the D-line ( $n_d$ ) and an Abbe number ( $v_d$ ) is defined as  $n_d \leq -6.667 \times 10^{-3} v_d + 1.70$ , as recited in independent Claims 44, 46, 48, 50, and 61.

Claims 44-63 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-24 of U.S. Patent No. 6,759,471 (the ‘471 patent). Applicant traverses this rejection.

The claims of the ‘471 patent recite features not required by the independent claims recited herein. Accordingly, Applicant submits that the claims are patentably distinct from those recited in the ‘471 patent and request withdrawal of the double patenting rejection.

The remaining claims in this application are dependent claims which depend from the above-discussed independent claims. The dependent claims are believed allowable by virtue of this dependency, and for reciting other patentable features of the invention. Favorable and independent reconsideration of the dependent claims is requested.

For the foregoing reasons, Applicant requests withdrawal of the rejections under 35 U.S.C. § 102 and obvious-type double patenting, and allowance of this application.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,



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